

REMARKS

By the above amendment, claim 1 has been amended to clarify the method of etching by reciting the features as obtained by etching of the gate electrode film which were previously recited in the last paragraph of claim 1 in the first paragraph thereof as well as to recite the feature that the gate electrode film is etched to form a fine pattern comprising lines and spaces having a wide part and a narrow part. Furthermore, claim 1 has been amended to recite that the on-off modulating of the rf bias at a frequency of 100 Hz to 10 kHz is effected during etching of the gate electrode film. Additionally, new dependent claims 17 and 18 have been added to recite further features of the present invention in relation to Fig. 5 of the drawings of this application. That is, as described at page 12, lines 15-19 of the specification, by the etching as illustrated in Fig. 5 in accordance with the method of the invention, and as recited in claim 1, the rf bias is on-off modulated at a frequency of 100 Hz to 10 kHz during etching of the gate electrode film, which is represented by the polysilicon film 503, having a gate oxide film 502 underlying the same and provided on a Si substrate 501, vertical sidewalls and a flatly etched bottom surface are obtained without an aspect ratio dependence, so that the etch depth of a wide part 506 and that of a narrow space 505 are equal. Such features are additionally recited in new dependent claims 17 and 18, and applicants submit that the recited features of claim 1 and the dependent claims are not disclosed or taught in the cited art, as will become clear from the following discussion.

As to the rejection of claims 1, 2 and 4-7 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,093,332 issued to Winniczek et al in view of U.S. Patent 5,405,795 issued to Beyer et al and the rejection of claim 3 under 35 U.S.C.

103(a) as being unpatentable over Winniczek/Beyer further in view of U.S. Patent 5,378,311 issued to Nagayama et al, such rejections are traversed insofar as they are applicable to the present claims, and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to the requirements to support a rejection under 35 U.S.C. 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under §103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the recent decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjective belief and unknown

authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

In setting forth the rejection, the Examiner recognizes that "Winniczek does not teach that the layer underlying the layer being etched has a thickness of 6 nm or less. Winniczek does not teach that the layer underlying the layer being etched is a gate oxide." (emphasis added) Furthermore, Winniczek et al, contrary to the position set forth by the Examiner, does not disclose or teach "on-off modulating the rf bias at a frequency of 100 Hz to 10 kHz during etching of the gate or electrode film" (emphasis added) as recited in claim 1 and the dependent claims. Reference is made to Fig. 2(c) of the drawings of this application and as described at page 9, lines 13 and 14, "the rf bias applied to the sample is periodically on-off modulated" (emphasis added), which as clearly shown in Fig. 2(c) as well as in Figs. 3(a) and 3(b), indicates that the rf bias is applied during the "on period" and is not applied during the "off period" which is the meaning as understood by those skilled in the art to which the present invention pertains of "on-off modulation". On the other hand, Winniczek et al in Fig. 4 shows the prior art of applying a continuous rf bias power waveform without modulation and the invention of Winniczek et al as shown in Fig. 5 in which as described in col. 4, line 66 to col. 5, line 3, "Unlike the continuous RF bias power waveform of prior art Fig. 4, however, the maximum amplitude of the RF bias power waveform of Fig. 5 alternates between a high power level $P_{MAX-HIGH}$ and a low power level $P_{MAX-LOW}$." (emphasis added). Thus, as shown in Fig. 5, while the RF bias of Winniczek et al may be considered to be modulated at the frequency indicated by the Examiner, such does not represent on-off modulation of the rf bias

since the rf bias is continuously applied with the maximum amplitude being periodically changed. Thus, irrespective of the Examiner's position, Winniczek et al does not disclose or teach in the sense of 35 U.S.C. 103 on-off modulating, the rf bias at a frequency of 100 Hz to 10 kHz during etching of the gate electrode film, as recited in claim 1 and the dependent claims of this application. As such, applicants submit that claim 1 patentably distinguishes over Winniczek et al in the sense of 35 U.S.C. 103 with respect to such claimed feature as well as with respect to the features recognized by the Examiner as not being taught by Winniczek et al.

Applicants also submit that there is no disclosure or teaching in Winniczek et al of etching of the gate electrode film so as to provide a minimum feature size of the gate electrode film of 1 μ m or smaller and a thickness of the underlying film of 6 nm or smaller, and in which the gate electrode film is etched to form a fine pattern comprising lines and spaces having a wide part and a narrow space part. Furthermore, it is apparent that Winniczek et al fails to disclose or teach the recited features of the dependent claims including newly added claims 17 and 18 which recite the feature as described at page 12 of the specification, that the etching of the gate electrode film is effected with substantially no aspect ratio dependence and that the etching is effected so that an etched depth of wide part is substantially equal to an etch depth of the narrow part. Likewise, applicants submit that the features of dependent claims 2-7 are also not disclosed or taught by Winniczek et al in the sense of 35 U.S.C. 103. As such, applicants submit that all claims under consideration patentably distinguish over Winniczek et al in the sense of 35 U.S.C. 103 and should be considered allowable thereover.

With respect to the addition of Beyer et al, irrespective of whether or not Beyer discloses a gate structure wherein a 5 to 10 nm thick gate oxide underlies a layer of

polysilicon, Beyer et al provides no disclosure or teaching concerning on-off modulation of the rf bias in the manner as defined in claim 1, which feature, as pointed out above, is not disclosed by Winniczek et al. Thus, this proposed combination of references fails to provide the claimed features of claim 1 and the dependent claims in the sense of 35 U.S.C. 103, and all claims patentably distinguish over this proposed combination of references and should be considered allowable thereover.

With respect to the further utilization of Nagayama et al, hereagain irrespective of the disclosure of this reference, Nagayama et al does not overcome the deficiencies of Winniczek et al and Beyer et al as pointed out above at least with respect to on-off modulating of the rf bias, such that the proposed combination fails to provide the claimed limitations of claim 1 and the dependent claims including the feature of on-off modulating the rf bias in the manner defined in claim 1 nor the other features of claim 1 and the dependent claims, which are also not disclosed or taught by the other cited art. Thus, applicants submit that all claims patentably distinguish over this proposed combination of references in the sense of 35 U.S.C. 103 and should be considered allowable thereover.

In view of the above amendments and remarks, applicants submit that all claims under consideration in this application patentably distinguish over the cited art and should now be in condition for allowance. Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing

of this paper, including extension of time fees, to Deposit Account No. 01-2135 (520.36911VX1) and please credit any excess fees to such deposit account.

Respectfully submitted,



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